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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,512	05/25/2005	Jae-Hyun Kim	YOM0528US (OPP050737US)	6483
23413 7590 03/19/2009 CANTOR COLBURN, LLP 20 Church Street 22nd Floor Hartford, CT 06103				
EXAMINER LEE, SIN J				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
03/19/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

Office Action Summary

Application No.

10/536,512

Applicant(s)

KIM ET AL.

Examiner

Sin J. Lee

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 2/18/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. Claims 3-21 are canceled claims.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 and 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the amended claim 1, applicants are saying that the method comprises a step of adding an adhesivity enhancer to an organic anti-reflective composition, which already contains the adhesivity enhancer. Applicants need to delete "the adhesivity enhancer" on line 5 of the claim. Also, in claim 2, applicants need to delete the limitation (d) and instead, add a limitation such as "adding the adhesivity enhancer of Chemical Formula 1 in the amount of 30 to 400 parts by weight".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al ("A Novel Organic Bottom Anti-Reflective Coating Material for 193 nm Excimer Laser Lithography", Polymer 41 (2000) pg.6691-6694) in view of Pavelcheck et al (US 6,767,689 B2).

Hwang teaches a bottom anti-reflective coating ("BARC") composition for 193 nm excimer laser lithography containing polyvinyl phenol (as a UV absorber), present crosslinking agent of Formula 2, present thermal acid generator of Formula 4 and propylene glycol methyl ether acetate (an organic solvent) (see abstract, Fig.1 and section 2.3). Hwang's polyvinyl phenol also teaches present adhesivity enhancer of Formula 1 as well. Hwang does not teach present light absorbing agent of Formula 3.

Pavelcheck teaches (col.2, lines 28-40) an antireflective coating composition (for use with 248 nm and 193 nm lithography) containing a thermal acid generator and a crosslinking component. Pavelcheck furthermore teaches (col.6, lines 32-51 and claim 12) the use of a polymer having deep UV chromophores (such as those containing anthracyl groups) in the antireflective coating composition for deep UV applications so that the polymer will absorb reflections in the deep UV range (see col.6, lines 33-49). As specific example of such polymer, Pavelcheck discloses (see Example 1) a copolymer of anthracene methyl methacrylate, methyl methacrylate and 2-hydroxyethyl methacrylate, which teaches present polymer of Formula 3. Based on Pavelcheck's teaching, it would have been obvious to one skilled in the art to use Pavelcheck's polymer of Example 1 in Hwang's anti-reflective coating composition, which is also used in deep UV applications, in order to absorb reflections in the deep UV range as taught by Pavelcheck.

Hwang's BARC composition contains 0.57 g of the crosslinking agent, 0.1 g of the thermal acid generator, 1.0 g of polyvinylphenol (present adhesivity enhancer) and 40 g of propylene glycol methyl ether acetate (see section 2.3). This means that based

on 100 pbw of the crosslinking agent, there are 18 pbw of the thermal acid generator, 175 pbw of polyvinylphenol (present adhesivity enhancer) and 7018 pbw of propylene glycol methyl ether acetate (organic solvent). With respect to the amount of present light absorbing agent, Pavelcheck teaches that the resin such as his copolymer of anthracene methyl methacrylate, methyl methacrylate and 2-hydroxyethyl methacrylate is present in the amount of 69-90wt% in his composition (see col.7, lines 22-29) and that his crosslinker component is present in the amount of 7-25wt% in his composition (see col.8, lines 1-6). This means that for 100 pbw of crosslinker, there is 240-1286 pbw for Pavelcheck's copolymer (present light absorbing agent). Since this range overlaps with present range of 30-400 pbw, it renders present range prima facie obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a prima facie case of obviousness would exist which may be overcome by a showing of unexpected results, *In re Wertheim*, 541 F.2d 257, 191 USPQ (CCPA 1976).

Hwang's composition contains polyvinyl phenol (present adhesivity enhancer), which means that at certain point, polyvinyl phenol was added to his composition. Thus, Hwang in view of Pavelcheck render obvious present methods of claims 1 and 2.

Response to Arguments

6. Applicants argue that the improvement of their invention comes from a combination of the crosslinking agent, the light absorbing compound, the acid generator and the adhesivity enhancer, i.e., the composition as a whole gives the improved method. However, as discussed above, it is the Examiner's very position that Hwang in

view of Pavelcheck does teach or suggest such combination of the presently claimed components.

Applicants request the office to evaluate the composition of the examples and comparative examples in light of the goal of the invention which was to improve the pattern shape and argue that the data in table 1 and the figures demonstrate this goal was achieved. Specifically, in the example experiments, applicants *replace* some of the crosslinking agent in comparative examples 1-3 with the claimed adhesivity enhancer. Applicants argue that the replacement of some of the crosslinking agent with the adhesivity enhancer resulted in an unexpectedly improved pattern. Applicants argue that these experiments are a fair comparison relative to known compositions and the results demonstrate the unexpected improvement in pattern properties of the claim composition. By pointing to Example 2 and Comparative Example 1, applicants argue that the data show that the amount of crosslinker can be reduced by one-half when replaced with an equal amount of adhesivity enhancer and that the unexpected results are that in using the adhesivity enhancer in place of some of the crosslinker the pattern shape is good in example 2 versus pattern collapse with comparative example 1. Applicants argue that this comparison is more than fair because applicants are comparing the prior art containing a UV-absorber, thermal acid generator and a crosslinking agent to the claimed method which utilized these three ingredients with the addition of the adhesivity enhancer with some of the crosslinking agent being replaced with the adhesivity enhancer.

The Examiner disagrees. First of all, in order to show unexpected superior results of adding a component to a comparative example composition (i.e., the composition without that specific component), the types and the amounts for the rest of the components have to be the same between the comparative examples and examples so that the comparison is considered as fair. Secondly, as previously explained, Hwang's composition *already* includes polyvinyl phenol (present adhesivity enhancer). Thus, the comparison of Table 1 (which is trying to show the unexpectedly superior results of adding adhesivity enhancer) is not helpful in showing unexpectedly superior results of present invention over that of Hwang in view of Pavelcheck because the Office action is saying that it would have been obvious to add Pavelcheck's light absorbing agent to Hwang's composition. That is, the comparison of Table 1 is not showing unexpectedly superior results of adding Pavelcheck's light absorbing agent (present light absorbing agent of Formula 3) to Hwang's composition. The comparison has to be made with closest prior art. See MPEP 716.02(e). Finally, the results for Examples and Comparative Examples are merely stated as "good" and "pattern collapse". Since applicants give no definition for "good", which is a relative term, it is difficult to ascertain degree of improvement.

For the reasons stated above, present 103(a) rejection over Hwang in view of Pavelcheck still stands.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333.

The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
March 13, 2009